HUEBNER, GRACE, M.S. Non-Dieting Focused Weight Management Curriculum in Current Accredited US Dietetic Programs. (2019)
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Objectives: Non-dieting, weight neutral approaches (NDWN) to weight management that focus on non-restrictive dieting and healthy weight, such as Health at Every Size (HAES), have been effective in weight management practices, but the degree of assimilation in U.S. dietetics programs is unknown. The purpose of this study was to determine the awareness and prevalence of, and interest in non-dieting focused weight management curriculum and determine factors associated with the presence of the curriculum in Accreditation Council for Education in Nutrition and Dietetics (ACEND) accredited dietetic programs in the U.S.

Methods: Directors of all US dietetic Coordinated Programs (CP) (n = 60) and Didactic Programs in Dietetics (DPD) (n = 214) were sent an online cross-sectional survey via RedCap software. For inclusion, programs were required to be an ACEND accredited CP or DPD program. The survey included questions about the program, student and faculty demographics, program structure, and topics pertaining to NDWN curriculum including knowledge, awareness, and interest in a NDWN approach to weight management. Results were analyzed in R Studio Version 1.1.463.

Results: Of the 116 programs (42%) that responded, most (95%) reported knowledge of NDWN approaches to weight management such as HAES. While awareness was high, a smaller amount of schools (72%) included NDWN into their curriculum, and this was primarily accomplished in a single lecture (53%). For programs without NDWN, most (74%) indicated interest in having NDWN in the curriculum. The

most common factors that kept programs from including NDWN were: 1) lack of trained and knowledgeable staff (35%) and, 2) insufficient space in the curriculum to incorporate additional topics (35%).

Conclusions: Findings suggest that many programs have adopted NDWN curriculum, in a relatively modest manor, but that some US dietetic programs have fixable barriers to incorporation. A higher degree of incorporation may be needed to provide more comprehensive care and decrease weight bias among dietitians.

NON-DIETING FOCUSED WEIGHT MANAGEMENT CURRICULUM IN CURRENT ACCEDITED US DIETETIC PROGRAMS

by

Grace Huebner

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CHAPTER I

INTRODUCTION

The prevalence of obesity continues to be high in the United States, with 39.8% of adults classified as obese according to the 2015-2016 National Health and Nutrition Examination Survey.[1] Millions of patients seek the guidance of dietitians for weight management and diet counseling every year, but there are often mixed impacts on weight and dietary behaviors.[2–4] To this point, weight management counseling has mostly focused on the loss of excess weight, physical activity, and restrictive dieting,[5] but these approaches to weight management have not proven to be effective long-term.[2,5–7]

These mixed impacts could be due to the way that an individual's weight is approached at the beginning of the counseling encounter. Chronic disease risk has been clearly linked to the presence of visceral fat, and this evidence guides current assessment and weight management practices.[8] Thus, weight focused measures such as Body Mass Index (BMI) are often used as the first step to obesity screening and treatment, as it is a simple and convenient tool to assess potential disease risk.[9] It is recommended by the Academy of Nutrition and Dietetics that individuals with a BMI ≥ 25-29.9 (overweight) or ≥30 (obese) should be identified by the dietitian and provided with medical nutrition therapy.[9] BMI, on an individual level, is poor at indicating other health markers because body fat percent and visceral fat, not BMI is linked with poorer health outcomes.[10] Wildman et al found that a large proportion of the overweight (51%) and obese (32%)

classified population in their study were considered healthy while a large proportion of the normal weight individuals were unhealthy according to cardiometabolic parameters, suggesting that BMI profiling overlooks normal weight individuals who are not healthy and highlights large-bodied individuals who are not in need of being treated.[11] Using BMI as an indicator of health may also lead to weight bias by leading health professionals see larger bodies as less healthy and less likely to comply to treatment without first considering other factors, such as genetics and environment.[12,13]

Restrictive dieting, a major component in traditional weight maintenance methods, has not been as effective as once thought. Wing and Phelan suggest that of those in the general population that are trying to lose weight through traditional methods, 20% are actually successful in long-term weight loss maintenance.[3] Mann et al found that one-third to two-thirds of the restrictive dieters regained more weight than was lost on their diet.[4] Thus, there is a need for an additional approach to augment current practice which will help balance dietitian perspective and care practices.

In the early 2000s a new approach to weight management, a non-diet, weight neutral approach (NDWN) (e.g Health at Every Size) was introduced. This approach is centered around health, emphasizing self-acceptance and well-being, and promoting movement rather than restrictive dieting for weight management and chronic disease prevention.[14] This paradigm focuses on promoting intuitive eating practices to improve nutritional status and encouraging patients to develop a more positive body image as they move toward reduced disease risk.[5] The NDWN approach has been shown to have both short and long-term effects on improving participant's health markers such as diets,

eating patterns and behaviors, anthropometric and metabolic parameters and psychological wellbeing.[5,15–24]

The teaching of NDWN approaches may also help raise awareness of weight bias among dietetic and other health professionals by placing a focus on health rather than on weight. Those who experience weight bias from their health care providers are likely to avoid health screenings, cancel their appointments, and experience poorer outcomes from treatment.[9] These same individuals also report consuming more food and avoiding exercise.[7] Previous research has suggested that weight bias may be common among dietitians and dietetics students.[12,13] Brown and Humphrey et al both found that using a Health at Every Size (HAES) curriculum helped dietetic and health professional students to change their negative opinion of overweight individuals and become more compassionate towards overweight individuals.[15,25]

Thus, given the mixed results of current practice and the apparent prevalence of weight bias, there is a need for the incorporation of additional weight management approaches like NDWN in the dietetic curricula to improve patient care and reduce weight bias. While NDWN has been found to be an effective approach to weight and improving health outcomes, there has been limited research regarding the level of knowledge and incorporation of the approach among dietetics professionals. Using a validated cross-sectional survey distributed to 88,834 Registered Dietitian Nutritionists (RDNs), Schaefer and Zullo found that RDNs had some knowledge of intuitive eating approaches to weight management, a major component of NDWN approaches.[26] They also found that these same RDNs had positive attitudes towards intuitive eating.[26]

Incorporation of the NDWN as an additional approach to current practice could help improve the curriculum in dietetics programs and help it more closely align with evidenced-based practice. Dietitians are first exposed to care approaches during dietetic coursework, making it the ideal place for exposure to NDWN approaches. Incorporating NDWN as part of the standard of care could, therefore, lead to improved quality of care given by future dietitians and decrease the impact of weight bias on patient care. While there seems to be promising potential for this approach, little is known about the current incorporation of NDWN in accredited US dietetic programs, including the factors that might influence adoption. The Accreditation Council for Education in Nutrition and Dietetics (ACEND), the accrediting agency for education programs that prepare students for a career in dietetics, currently does not require the inclusion of NDWN curriculum for accreditation of dietetics programs. It is currently unknown whether NDWN curriculum is taught within ACEND accredited dietetics programs. Thus the goal of this study was to evaluate the awareness, prevalence of, interest in and predictors of implementation of the NDWN approach in US dietetics programs. The approach is aligned with the Diffusion of Innovations Theory, which suggests that there are characteristics of elements of a system that influence the adoption of innovations and that understanding these characteristics is important to achieve wider diffusion.

Thus, we examined the awareness, interest in, and prevalence and predictors of NDWN curriculum, as well as beliefs about weight bias and BMI among dietetic program directors of both accredited coordinated program (CP) and didactic program in dietetics (DPD)) in the US using an online cross-sectional survey. We hypothesized that a majority of the directors of US dietetic programs would be aware and interested in NDWN

approaches with lower levels of prevalence of NDWN in program curricula. We also hypothesized that programs with NDWN approaches will have more Registered Dietitian Nutritionists (RDNs) on staff than programs without NDWN approaches. Of the programs without NDWN approaches in their curriculum, we hypothesized that the absence of knowledgeable and trained faculty would be the primary reason a NDWN type curriculum has not been incorporated.

CHAPTER II

LITERATURE REVIEW

To this point, weight management counseling has mostly focused on the loss of excess weight, physical activity, and restrictive dieting,[5] but these approaches to weight management have not proven to be effective long-term.[2,5,6] Multiple studies discuss why it is difficult to lose weight and to keep it off. Hall and Kahan suggest that weight maintenance in the long-term is a challenge due to the interactions of biology, behavior and the obesogenic environments that we live in.[6] Blomain et al studied the effects of weight regain and also found that our bodies have evolved to maintain body weight by activating redundant mechanisms. These redundant mechanisms explain why it is so hard to keep weight off.[2] Wing and Phelan suggest that of those in the general population that are trying to lose weight, 20% are actually successful in long-term weight loss maintenance.[3] Mann et al found that one-third to two-thirds of the dieters regained more weight than was lost on their diet.[4]

Not only is it hard to keep the weight off, but many individuals who are on diets do not see the improvement in associated cardiometabolic parameters, morbidity, and mortality. Weight fluctuation from trying to lose weight is associated with obesity-related diseases, poor cardiovascular outcomes, and increased mortality risk.[7]

Working with a dietitian can be beneficial in weight management efforts, as Raatz and colleagues found that interaction with a Registered Dietitian Nutritionist (RDN)

greatly improved weight-loss efforts.[27] Despite this relative success, not all interactions with RDN's lead to successful and healthy weight management. Factors in the dietitian nutrition care process around weight management may negatively impact the patient's efforts.

Therefore, there may be complementary approaches that could improve upon the current model. Recently a new approach to weight management was introduced, a NDWN approach, such as HAES. This and similar approaches are centered around health, emphasizing self-acceptance and well-being rather than restrictive dieting for weight management.[14] The constructs of these approaches include: 1) encouraging body acceptance, 2) reliance on internal regulatory processes (such as hunger and satiety cues), and 3) active embodiment, rather than structured exercise.[7] Studies have found that the promotion of body shame or unhappiness induces harm which in turn results in less favorable lifestyle choices.[7] Self-acceptance is the first step to self-care, people with strong self-esteem are more likely to adopt healthier lifestyles.[7] The second construct is reliance on internal hunger and satiety cues, this includes intuitive eating. Intuitive eating involves actively listening and responding to hunger, appetite and satiety signals while eating. This does not mean that the client is at a healthy weight currently, but that adoption of a healthy lifestyle will help them settle at a healthy weight for their particular body.[14] Lastly, a NDWN approach focuses on "active embodiment" (helping the client find enjoyable ways of being active doing things they enjoy). According to the HAES paradigm, "… a healthy weight is a weight at which a person settles at as they move toward a more healthful lifestyle." [14]

The NDWN paradigm encourages patients to develop a more positive body image, accept different body shapes and sizes and promotes intuitive eating practices.[5] The NDWN approach has shown to have both short and long-term effects on improving participant's diets, eating patterns and behaviors, anthropometric and metabolic parameters and psychological well-being. [5,15–24]

Researchers have found multiple short-term effects of NDWN interventions for weight management. Ulian et al found that a seven-month interdisciplinary HAES-based intervention in obese women improved the participants' eating attitudes and practices, perception of body image, physical capacity, and health-related quality of life with no changes in body weight or spontaneous physical activity levels.[5] Leblanc et al found that energy intake and snack frequency decreased over time in all three groups (HAES group, social support group and control group) and proportion of energy intake from breakfast increased in all three groups. In the HAES group, specifically, Leblanc and colleagues found decreases in hunger, both internal hunger cues and external cues of hunger, were related to a decrease in total daily energy intakes.[24] Provencher et al found that in a population of premenopausal women classified as overweight or obese, HAES groups, compared to control (usual lifestyle habits), had significant decreases in susceptibility to hunger and external hunger cues, as well as decreases in hunger, desire to eat, and in weight following a four-month intervention.[17] Carroll et al found that a three-month, non-dieting intervention which was consistent with HAES approaches, significantly improved psychological well-being and cardiorespiratory fitness in clinically obese premenopausal women.[21] Carbonneau and colleagues' results indicate that a HAES intervention improved quality of food intake in the short term in women.[16] Mensinger et al found that

weight neutral approaches to weight management improved global disordered eating scores compared to control groups and maintained these changes after six months in clinically obese women.[19] Humphrey et al found that introduction of HAES in a college course improved intuitive eating and body esteem in students compared to students in the control and comparison groups.[15] Bacon et al found that a non-diet approach can produce improvements in metabolic fitness, eating behavior, psychology and minimize attrition to the weight management program in women classified as obese.[28]

There have also been a few studies that investigated the long-term effects of NDWN interventions for weight management. In a one year follow-up study by Provencher et al, findings suggest that a HAES intervention has long-term beneficial effects on eating behaviors related to disinhibition and hunger when compared to a control group.[18] Gagnon-Girouard et al found that after one year following treatment HAES groups presented a more positive improvement in psychological variables and body weight in women classified as overweight or obese.[23] Mensinger et al found that two years following a HAES intervention, waist-to-hip ratio, total cholesterol, physical activity, fruit and vegetable intake, self-esteem and quality of life were all improved from baseline in clinically obese women.[20] Borkoles et al found that their participants had improved psychological functioning following a three-month non-dieting lifestyle intervention and maintained psychological functioning 12 months following the intervention in women with BMI ≥ 35.[22] In a two-year follow-up study with women classified as obese by Bacon et al findings suggest that those who participated in a non-diet weight management program had maintained size acceptance, reduction in dieting

behaviors and heightened awareness to body signals.[28] While more research on NDWN approaches needs to be done such as research on men and those who have a BMI ≥ 30 because most of the research has included women with BMIs between 25 and 30,[29] there is evidence that points to positive health effects for the whole body.

The teaching of NDWN approaches may also help reduce weight bias among dietetics professionals by placing a focus on health rather than on weight. Humphrey et al found that a HAES class impacted the students in the class by making them more compassionate and understanding toward others who face weight stigma.[15] Brown also found that teaching the HAES approach to future fitness and health professionals helped to change their outlook on those who are overweight. The future fitness and health professionals learned that by educating patients on healthy habits, rather than teaching diet and exercise, patients are healthier and happier.[25] Rosalez found that anti-fat attitudes decreased after dietetic students were taught an HAES curriculum compared to the control group, and significantly improved the student's knowledge of HAES.[30] This study indicates that following a NDWN curriculum can improve knowledge of this weight-neutral approach to health and can reduce anti-fat attitudes in dietetic students.[30]

It is important for dietetic students, dietitians and other health professionals to be aware of weight bias because it can have harmful effects on the patient. Explicit bias is the attitudes and beliefs that a person or a group of people have on a conscious level. Explicit bias can be expressed through speech or discrimination that results from deliberate thoughts. Implicit bias is the attitudes and stereotypes that a person or group of people have on an unconscious level.[31] Explicit bias can often be regulated because it is

on the conscious level, while implicit bias is harder to regulate because it is part of our unconscious mind.[31] These attitudes and stereotypes can affect our understanding, actions, and decisions in the workforce and in everyday life. Weight bias, where there are negative weight-related attitudes, beliefs, assumptions, and judgments towards overweight individuals,[32] is associated with negative health outcomes. Those who experience weight bias from their health care providers are likely to avoid health screenings, cancel their appointments, and experience poorer outcomes from treatment.[9] These same individuals also report consuming more food and avoiding exercise.[7] Previous research has suggested that weight bias may be common among dietitians and dietetics students.[12,13]

Alberga and colleagues argue that weight bias may be influencing patient wellbeing related to weight-related issues.[32] These researchers mention that weight bias: 1) is common and has adverse health consequences, 2) it does not motivate positive behavior changes, 3) public health programs can perpetuate weight bias if not well thought out, 4) is a manifestation of social inequality, and 5) action to reduce weight bias requires a population level approach in multiple settings.[32] Through review of the research, Alberga et al found that weight bias is associated with anxiety, stress, depression, low self-esteem, and body image issues and that these feelings motivate unhealthy eating behaviors such as fasting, extreme dieting, and compulsive exercising.[32] Lastly, Alberga and colleagues mention that people who have "large bodies" are not treated equally in certain sectors of society such as in employment, education, and healthcare.[32]Alberga et al suggest that health programs should be focused on healthy behaviors rather than weight.[32]

Diversi et al examined the impact of weight bias on Australian dietitians' practices and client weight status.[12] Results indicated that these dietitians had a mild fat phobia and that weight status impacted the dietitian's assessment, recommendations, and perceptions of the client from the dietitian. The dietitians assessed an obese female client to have lower health, were more likely to give uninvited weight management recommendations, saw the client as less motivated to change and less likely to comply with treatment.[12] These observations found by Diversi et al illustrate that weight bias among dietitians exists and that it greatly affects their practice.

In a study done by Puhl et al the attitudes and beliefs of dietetic students towards obese patients were examined and tested whether the patient's body size influenced the treatment decisions and health evaluations that the student gave to the patient.[13] Like Diversi et al, Puhl and colleagues found that the dietetic students had a moderate amount of fat phobia and saw obese patients as less likely to follow treatment recommendations ($p < 0.05$).[13] Students also gauged an obese patient's diet quality and health status to be poorer than non-obese patients. Unlike Diversi et al, though, Puhl et al found that obese and non-obese patients were found to be similarly motivated and receptive to these dietetic students.[13] Both Puhl et al and Diversi et al found that dietitians and dietetic students had a moderate amount of fat phobia and that they saw obese patients as less healthy and less likely to comply to treatment, which can have a negative impact on the patient's outcome.[12,13] Puhl et al suggest that there is a need to increase awareness of weight bias in dietetics curricula in order to correct the weight bias problem.

Given the ineffectiveness of current practice and the prevalence and harm of weight bias, there is a need for the incorporation of complementary approaches like NDWN in the dietetic curricula on improving weight management and reducing weight bias. Currently, the Association for Size Diversity and Health, the National Association to Advance Fat Acceptance, and the Society for Nutrition Education and Behavior offer a free Health at Every Size curriculum for the education of students and health professionals.[33] The curriculum, which includes videos and other supplemental materials, can be used to educate students and health professionals alike to adopt a weight-neutral approach to health and fill a void in health curriculum at colleges, universities and professional training programs.[33]

ACEND accreditation is required of any dietetics program that wants to prepare students for a career in dietetics. A student must complete an ACEND accredited program in order to sit for the Commission on Dietetic Registration exam, allowing them to become a Registered Dietitian Nutritionist. ACEND has some standards that universities must meet in order to be accredited. Some basic science course requirements that ACEND looks for in the colleges and universities include: organic chemistry, biochemistry, anatomy, physiology, genetics, microbiology, pharmacology, statistics, nutrient metabolism, human behavior, and psychology.[34] The programs must also include courses such as: research methodology, communication skills, education/counseling/behavior change theories, the governance of nutrition and dietetics practice, principles and techniques of effective education/counseling/behavior change theories, medical nutrition therapy, environment/food/nutrition health promotion and disease prevention, public policy, food science, healthcare delivery systems, and quality

management of food and nutrition services.[34] The NDWN approach could fit into the requirements of ACEND accreditation. NDWN paradigms are an effective technique of education/counseling/behavior change as well as a method of weight management that could be taught in medical nutrition therapy.

The Diffusion of Innovations Theory is a theory that can be used to explain how, why and at what rate a new idea is spread. Some people or programs are more apt than others to adopt a new idea, behavior or product and these early adopters have different characteristics than those who adopt innovations later on.[35] It is important to understand the characteristics of those who adopted the new innovation early on to find out what will help or hinder the adoption of the innovation in the rest of the population.[35] This theory was used to inform our approach to identify the degree that the NDWN approach is being incorporated into the dietetics curriculum in US dietetics programs. We identified which program directors know of this approach, are interested in the approach, and those who have incorporated it into their curriculum, and assessed factors that might be influencing the diffusion of innovation. We then identified what barriers affect the incorporation of the NDWN approach into dietetic education curriculum of those schools who do not currently offer the curriculum.

To our knowledge, there is no literature that has evaluated the knowledge of, interest in, prevalence and barriers of NDWN approaches to weight management in the current accredited dietetic program curriculum.

CHAPTER III

JOURNAL ARTICLE

NON-DIETING FOCUSED WEIGHT MANAGMENT CURRICULUM IN CURRENT ACCREDITED US DIETETIC PROGRAMS

Note: The manuscript below is formatted based on the author's guidelines of a peer-review journal titled "*Journal of Nutrition Education and Behavior*," where this paper will be submitted.

Introduction

The prevalence of obesity continues to be high in the United States, with 39.8% of adults classified as obese according to the 2015-2016 National Health and Nutrition Examination Survey.[1] Millions of patients seek the guidance of dietitians for weight management and diet counseling every year, but there are often mixed impacts on weight and dietary behaviors.[2–4] To this point, weight management counseling has mostly focused on the loss of excess weight, physical activity, and restrictive dieting,[5] but these approaches to weight management have not proven to be effective long-term.[2,5–7]

These mixed impacts could be due to the way that an individual's weight is approached at the beginning of the counseling encounter. Chronic disease risk has been clearly linked to the presence of visceral fat, and this evidence guides current assessment and weight management practices.[8] Thus, weight focused measures such as Body Mass Index (BMI) are often used as the first step to obesity screening and treatment, as it is a

simple and convenient tool to assess potential disease risk.[9] It is recommended by the Academy of Nutrition and Dietetics that individuals with a BMI ≥ 25-29.9 (overweight) or ≥30 (obese) should be identified by the dietitian and provided with medical nutrition therapy.[9] BMI, on an individual level, is poor at indicating other health markers because body fat percent and visceral fat, not BMI is linked with poorer health outcomes.[10] Wildman et al found that a large proportion of the overweight (51%) and obese (32%) classified population in their study were considered healthy while a large proportion of the normal weight individuals were unhealthy according to cardiometabolic parameters, suggesting that BMI profiling overlooks normal weight individuals who are not healthy and highlights large-bodied individuals who are not in need of being treated.[11] Using BMI as an indicator of health may also lead to weight bias by leading health professionals see larger bodies as less healthy and less likely to comply to treatment without first considering other factors, such as genetics and environment.[12,13]

Restrictive dieting, a major component in traditional weight maintenance methods, has not been as effective as once thought. Wing and Phelan suggest that of those in the general population that are trying to lose weight through traditional methods, 20% are actually successful in long-term weight loss maintenance.[3] Mann et al found that one-third to two-thirds of the restrictive dieters regained more weight than was lost on their diet.[4] Thus, there is a need for an additional approach to augment current practice which will help balance dietitian perspective and care practices.

In the early 2000s a new approach to weight management, a non-diet, weight neutral approach (NDWN) (e.g Health at Every Size) was introduced. This approach is

centered around health, emphasizing self-acceptance and well-being, and promoting movement rather than restrictive dieting for weight management and chronic disease prevention.[14] This paradigm focuses on promoting intuitive eating practices to improve nutritional status and encouraging patients to develop a more positive body image as they move toward reduced disease risk.[5] The NDWN approach has been shown to have both short and long-term effects on improving participant's health markers such as diets, eating patterns and behaviors, anthropometric and metabolic parameters and psychological wellbeing.[5,15–24]

The teaching of NDWN approaches may also help raise awareness of weight bias among dietetic and other health professionals by placing a focus on health rather than on weight. Those who experience weight bias from their health care providers are likely to avoid health screenings, cancel their appointments, and experience poorer outcomes from treatment.[9] These same individuals also report consuming more food and avoiding exercise.[7] Previous research has suggested that weight bias may be common among dietitians and dietetics students.[12,13] Brown and Humphrey et al both found that using a Health at Every Size (HAES) curriculum helped dietetic and health professional students to change their negative opinion of overweight individuals and become more compassionate towards overweight individuals.[15,25]

Thus, given the mixed results of current practice and the apparent prevalence of weight bias, there is a need for the incorporation of additional weight management approaches like NDWN in the dietetic curricula to improve patient care and reduce weight bias. While NDWN has been found to be an effective approach to weight and

improving health outcomes, there has been limited research regarding the level of knowledge and incorporation of the approach among dietetics professionals. Using a validated cross-sectional survey distributed to 88,834 Registered Dietitian Nutritionists (RDNs), Schaefer and Zullo found that RDNs had some knowledge of intuitive eating approaches to weight management, a major component of NDWN approaches.[26] They also found that these same RDNs had positive attitudes towards intuitive eating.[26]

Incorporation of the NDWN as an additional approach to current practice could help improve the curriculum in dietetics programs and help it more closely align with evidenced-based practice. Dietitians are first exposed to care approaches during dietetic coursework, making it the ideal place for exposure to NDWN approaches. Incorporating NDWN as part of the standard of care could, therefore, lead to improved quality of care given by future dietitians and decrease the impact of weight bias on patient care. While there seems to be promising potential for this approach, little is known about the current incorporation of NDWN in accredited US dietetic programs, including the factors that might influence adoption. The Accreditation Council for Education in Nutrition and Dietetics (ACEND), the accrediting agency for education programs that prepare students for a career in dietetics, currently does not require the inclusion of NDWN curriculum for accreditation of dietetics programs. It is currently unknown whether NDWN curriculum is taught within ACEND accredited dietetics programs. Thus the goal of this study was to evaluate the awareness, prevalence of, interest in and predictors of implementation of the NDWN approach in US dietetics programs. The approach is aligned with the Diffusion of Innovations Theory, which suggests that there are characteristics of elements of a system

that influence the adoption of innovations and that understanding these characteristics is important to achieve wider diffusion.

Thus, we examined the awareness, interest in, and prevalence and predictors of NDWN curriculum, as well as beliefs about weight bias and BMI among dietetic program directors of both accredited coordinated program (CP) and didactic program in dietetics (DPD)) in the US using an online cross-sectional survey. We hypothesized that a majority of the directors of US dietetic programs would be aware and interested in NDWN approaches with lower levels of prevalence of NDWN in program curricula. We also hypothesized that programs with NDWN approaches will have more Registered Dietitian Nutritionists (RDNs) on staff than programs without NDWN approaches. Of the programs without NDWN approaches in their curriculum, we hypothesized that the absence of knowledgeable and trained faculty would be the primary reason a NDWN type curriculum has not been incorporated.

Methods

Sample Selection

A list of all ACEND accredited universities was obtained from the ACEND website to identify the program directors. Inclusion criteria were that the programs must be accredited by ACEND and either be a CP (n = 60) or didactic program in dietetics (n = 214). Dietetic Internship programs (n=262) were excluded due to the fact that students who are in these types of programs have already completed a DPD program and not involved in structured lectures during the internship.

Survey Instrument

The survey contained questions about the programs, including student and faculty demographics, and topics pertaining to weight bias curriculum including knowledge, awareness, and interest in a NDWN approach to weight management. Definitions of weight bias and NDWN approaches were included for respondents. Questions had both closed and open-ended response options (to allow for additional feedback).

Directors were asked the number of faculty in their department (part- and full-time) and how many of these faculty were also RDNs to help understand the size of the department and if the number of RDNs present was a factor in awareness or incorporation. Directors also indicated whether the institution was a public or privately funded institution to see if there were differences in awareness, interest, or incorporation between institution types. Additional information was gathered such as class size, degree type granted (undergraduate, graduate, or both), and location (state) of each program from the ACEND website. Schools were grouped by U.S. regions according to the US Census Bureau into Northeast (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania), South (Delaware, Maryland, Virginia, West Virginia, Kentucky, North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas, and Oklahoma), West (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, California, Oregon, Washington, Alaska and Hawaii) and Midwest regions (Ohio, Michigan, Indiana, Wisconsin, Illinois, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas).[36]

Questions pertaining to weight bias included: “BMI is a good determinant of health status” and “Weight-bias (bias is attitudes or stereotypes that affect an individual’s understanding, actions, and decisions) among healthcare workers is an important topic within the field of dietetics.” For both questions, respondents were given a five-point Likert scale of potential responses (strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree).

To determine awareness of NDWN approaches, participants were asked whether they had heard of a NDWN (not focusing on weight or reaching a certain weight) approaches to weight management, such as Health at Every Size (Yes or No). If they had heard of NDWN approaches, they were then asked to identify where they had heard it from a list of possibilities including: textbook, journal articles, professional organization, conference or presentations, news or book (personal reading).

To determine the prevalence of NDWN approaches in current US dietetic curricula, participants were asked “Are non-diet, weight neutral approaches taught in your curriculum?”, with response options of ‘yes’, ‘no’, or ‘not aware’. In order to better understand how thoroughly NDWN approaches are taught in these institutions, participants who replied “yes” were asked to what extent that the approaches were incorporated into their curriculum, with response options of ‘a lecture – one class period only’, ‘chapter/module’, ‘a whole course is dedicated to this’, ‘workshops or case studies’, or ‘other’. If respondents reported that NDWN approaches were not in their curriculum, they were asked to identify reasons why this approach has not been incorporated, with response options including: ‘there is no room in curriculum’, ‘no trained or knowledgeable faculty’, ‘do not think it is a priority’, or ‘we like our current

curriculum around weight management'. Participants were also given an option to provide open-ended information as to why NDWN approaches are not incorporated into their curriculum.

Lastly, to determine interest in NDWN approaches, respondents who replied that NDWN approaches are not in their current curriculum were asked if they were interested in including it in their curriculum. The survey was estimated to take approximately 10 minutes to complete. All survey materials were approved for by the Institutional Review Board at the University of North Carolina at Greensboro as not human subjects research. Response was voluntary and no incentives were given for survey completion.

The survey was content validated by four curriculum and dietetics experts in the Nutrition Department at the University of North Carolina at Greensboro. The survey was built and distributed using the RedCap survey software. The survey was distributed to the head of the institution's dietetics program for completion by email during December 2018-January 2019. Weekly email reminders were sent out for four weeks in the first round and weekly for two additional weeks in the second round of surveys for those who had not completed the survey.

Data Analysis

The main outcome of interest was the presence of NDWN style curriculum (yes/no/unaware), with independent variables including number of RDNs on faculty, university type (public/private), and program type (CP/DPD). Frequencies were used for univariate analyses of categorical variables while frequencies and Fishers Exact tests were used for bivariate analysis of categorical variables. Means and standard deviations were used for reporting the number of faculty and percent RDN. The number of faculty,

percent RDN, and class size were also examined to see if they were normally distributed using a Shapiro-Wilk test. After finding non-normal distributions, a Kruskal-Wallis non-parametric one-way analysis test was used to compare percent of faculty having RDN credential and class size by curriculum presence (yes/no/unaware) and Mann-Whitney non-parametric t-test of sample means was used to compare percent of faculty having RDN credentials, and class size by awareness (yes/no) and interest (yes/no). Qualitative data from an open-ended response was reviewed. Statistical significance was defined as $p<0.05$. Quantitative data from the surveys were analyzed in R Studio Version 1.1.463.

Results

We received 116 completed surveys out of the 274 distributed surveys for a response rate of 42%. Most of our respondents were from DPD programs (75%), from public institutions (74%) and offer undergraduate degrees (81%) (Table 1).

Awareness and Beliefs

A summary of findings related to awareness and beliefs of NDWN can be found in Table 2. Overall, most program directors (95%) were aware of NDWN approaches to weight management such as HAES. The program directors who had heard of NDWN approaches indicated that they had heard of these approaches through conferences or presentations (77%), a professional organization (69%), journal article (65%), book (37%), news (35%) and textbooks (21%).

We observed no differences in awareness of NDWN approaches between institution type (private/public), program type (CP/DPD), percent of faculty that are RDNs, and region (Northeast/South/Midwest/West), or degree type

(undergraduate/graduate/both). Awareness differed based on class size with larger class sizes having higher awareness ($p = 0.04$) (Table 3).

In regard to beliefs about NDWN, most of the respondents (67%) reported that they "strongly agree" that weight-bias among healthcare workers is an important topic within the field of dietetics, while about 26% responded that they "somewhat agree". A few respondents answered that they were neutral on the topic (5%) or somewhat disagreed (2%). Almost half of the respondents, 44%, reported that they "somewhat agree" that BMI is a good determinant of health status, with approximately one-third of respondents (30%) reporting that they "somewhat disagree" with that statement.

Prevalence

A summary of findings related to the prevalence of NDWN can be found in Table 4. While awareness was high (95%), a smaller number of programs (72%) actually had a NDWN approach present in their curriculum. Of those who had NDWN approaches taught in their curriculum, program directors indicated that it was primarily taught in a single lecture (53%). Less common responses of how the NDWN approaches were incorporated into the curriculum included chapter/module (30%), workshops or case studies (4%), a whole course dedicated to the topic (1%), or by other means (12%),

We observed no differences in presence of a NDWN type curriculum between institution type (public/private), program type (CP/DPD), percent of faculty that are RDNs, class size, and region (Northeast/South/Midwest/West) or degree type (undergraduate/graduate/both)**.** We observed a significant difference between presence of NDWN type curriculum and awareness of NDWN approaches ($p = 0.01$) such that awareness is higher when NDWN is in the curriculum (Table 3). Of the programs without

a NDWN curriculum, 35% of them mentioned that there was no room in their current curriculum, and they lacked knowledgeable staff trained in this area.

Program directors who did not have NDWN in their curriculum were also given a chance to further describe why it was not present through an open-ended question. We had eight responses to this question. Responses were as follows: "if I had more information," "teaches students to ignore weight," "I would need to determine what classes to include this in," "Weight management and health promotion is not one-size fit all," "Not convinced that weight neutral approach is valid," "…something I will look into in the future," "…some faculty do not believe in this approach," "topic has not been brought up."

Interest in NDWN Among Programs without Current NDWN Curriculum

Of those without a NDWN approach in their curriculum, a large number of the program directors (74%) were interested in incorporating this approach to curriculum (Table 4). There were no significant differences between interest in incorporating a NDWN approach into the curriculum and institution type (public/private), program type (CP/DPD), percent faculty that are RDNs, class size, and region (Northeast/South/Midwest/West) or degree type (undergraduate/graduate/both) (Table 3).

Discussion

Most of the respondents had heard of NDWN approaches to weight management, mostly through conferences or presentations and through professional organizations. Professional organizations, who often sponsor conferences and presentations, should consider stronger initiatives to incorporate NDWN approaches as a complementary approach to standard care practices given that they play such a large role in the awareness

of these approaches. This may also suggest that faculty who are not a part of professional organizations may not have heard of or may have lower levels of knowledge of NDWN approaches to weight management. Thus, special attention should be given to strategies to increase knowledge of complementary approaches like NDWN among this population. A very small number of respondents had heard of this approach through textbooks, which is concerning since textbooks are a common training platform for students in dietetics programs. This finding may indicate that this paradigm has had limited incorporation into current textbooks, and that the increased incorporation of NDWN would be an important step to helping improve the establishment of NDWN approaches into the dietetics curriculum. We also found that awareness differed by class sizes with the programs with larger class sizes having more awareness than those with smaller class sizes. This may suggest that larger schools, who typically have larger class sizes, may have more exposure to NDWN approaches than smaller schools. This could potentially be because larger schools have more resources to encourage professional development.

While most program directors had heard of NDWN approaches to weight management, a smaller, but still substantial amount of programs actually had this paradigm incorporated into their program curriculum. This agrees with our initial hypothesis. Among these programs who had NDWN curriculum, the majority (53%) dedicated a limited amount of time to the issue by teaching it solely through a lecture. Humphrey and Rosalez saw positive impacts on nutrition students' weight bias and response to overweight persons after students completed a whole course dedicated to the NDWN subject, suggesting that one lecture may not be enough to impact students and the dietetic practice.[15,30]

According to respondents, lack of trained or knowledgeable staff and no room in their current curriculum were the most common reasons why they had not yet included NDWN approaches into their curriculum, which are seemingly fixable barriers to implementation. ACEND does not require that NDWN approaches be taught in order for dietetics programs to receive accreditation, however, the NDWN approach could easily fit into ACEND accreditation requirements as a complementary approach to standard care. Currently, there is a website that provides Health at Every Size curriculum and tools for teaching,[29] which could help programs incorporate these concepts more easily. Thus, providing support to properly train dietetic program staff, increasing the availability of resources to research the topic, and providing innovative ideas of how to include NDWN in the current curriculum would benefit these programs and possibly increase the prevalence of NDWN approaches in the curriculum.

In this study, directors of dietetic programs reported they believed that weight-bias among healthcare professionals is an important topic within the field of dietetics. This outcome is important to note because previous research has suggested that weight bias may be common among dietitians and dietetics students.[12,13] Both Diversi et al and Puhl et al found that dietitians and dietetic students can exhibit fat phobias which in turn affects the level of care given to the patient[12,13] indicating that weight bias is an important topic that needs to be addressed with dietitians and dietetic students. Thus, there is a need to increase awareness of weight bias in dietetics curricula in order to improve the quality of care given to paitents. By focusing on health rather than weight status, NDWN may be one of a multi-facted approach that could help faciltate this.

While many of the survey respondents believed weight-bias is an important topic, many also believed that BMI is a good determinant of health. Although BMI can be useful as a screener, BMI, alone is poor at indicating percent body fat and information on fat mass in different sites on the individual level.[10] NDWN in curriculum could clarify the difference between using solely BMI to identify who needs obesity treatment versus using a broader range of tools to identify health risks. NDWN may be an additional approach that could provide more comprehensive care and decrease weight bias.

More research should also be done to further the evidence toward effectiveness of NDWN approaches in males, those who are classified as obese class II (BMI ≥ 35-39.9) and class III (BMI ≥ 40), and in more diverse populations. Many of the current research studies have focused their attention on White females who are either classified as overweight (BMI ≥ 25-29.9) or obese class I (BMI ≥ 30-34.9).[30]

One potential limitation to our study was the limited questioning on our survey. We tried to highlight the factors that may be driving the presence or non-presence of a NDWN curriculum while also trying to limit respondent burden. Another potential limitation was the recruitment email we sent for the survey. For this study, we reached out to all of the eligible programs and received a fairly large sample, which is a major strength to the study. Another strength was that we asked questions that revealed important information about the degree of implementation and interest of implementation rather than merely the presence of the curriculum.

Implications for Research and Practice

Findings suggest that many programs have adopted NDWN into their curriculum to some degree, but the extensiveness of the current curriculum is minimal, with most programs dedicating limited and possibly insufficient time to the concepts of NDWN. Future, more in-depth research should be done to give a better understanding of this topic. Future studies should explore a more in-depth response due to the complexity of this issue. Other approaches, such as qualitative interviews, may help to better clarify factors of presence or non-presence of NDWN approaches and the degree to which the approaches are incorporated into the curriculum. We believe efforts should be considered to support dietetics programs to incorporate more evidence-based complementary approaches to care such as NDWN, including policy change, support from professional and accreditation agencies, structured and accessible training dietetic program staff, and updated curriculum requirements to prioritize these potentially impactful approaches to care.

Table 1. Respondent Characteristics

Characteristics	**Respondents (n=116)**
Institution Type	
Private (n, %)	30 (25.9%)
Public (n, %)	86 (74.1%)
Program Type	
Coordinated Program (n, %)	29 (25%)
Didactic Program in Dietetics (n, %)	87 (75%)
Degree Type Granted	
Undergraduate Degree (BS and/or BA) (n, %)	94 (81.0%)
Graduate Degree (MPH, MS, MA, MBA and/or PhD) (n, %)	12 (10.3%)
Both Undergraduate and Graduate Degree (n, %)	10 (8.6%)
Region	
South (n, %)	46 (39.7%)
Midwest (n, %)	28 (24.1%)
Northeast (n, %)	26 (22.4%)
West (n, %)	16 (13.8%)
Faculty and Students	
Number of faculty (mean ± SD)	10 ± 8.27
Percent RDN (mean ± SD)	73% ± 27%
Class Size (mean ± SD)	57.2 ± 51.4

Table 2. Summary of Responses Regarding Awareness and Beliefs of NDWN Approaches

Survey Topic	**n = 116**
Aware of NDWN approaches	
Yes (n, %)	110 (94.8%)
No (n, %)	6 (5.2%)
Where respondents had heard of NDWN approaches*	
Conference or Presentations (n, %)	85 (77.3%)
Professional Organization (ex: The Academy) (n, %)	76 (69.1%)
Journal Article (n, %)	71 (64.5%)
Book (personal reading) (n, %)	41 (37.3%)
News (n, %)	38 (34.5%)
Textbook (n, %)	23 (20.9%)
Weight-bias among healthcare workers is an important topic within the field of dietetics.	
Strongly Agree (n, %)	78 (67.2%)
Somewhat Agree (n, %)	30 (25.9%)
Neutral (n, %)	6 (5.2%)
Somewhat Disagree (n, %)	2 (1.7%)
Strongly Disagree (n, %)	0(0%)
BMI is a good determinant of health status	
Strongly Agree (n, %)	4 (3.5%)
Somewhat Agree (n, %)	51 (44.3%)
Neutral (n, %)	7 (6.1%)
Somewhat Disagree (n, %)	34 (29.6%)
Strongly Disagree (n, %)	19 (16.5%)
*n = 110, responses were only recorded for those who answered they were aware of NDWN approaches. Respondents had the option to choose all that applied.	

Table 3. Factors Associated with Awareness, Prevalence and Interest of NDWN Approaches

	Variable	p-Value
Awareness	Institution Type (public/private)	1.0
	Program Type (CP/DPD)	0.16
	Percent Faculty RDNs	0.88[a]
	Class Size	0.04[a]*
	Region (Northeast, South, Midwest, West)	0.69
	Degree Type (Undergraduate/Graduate/Both)	0.72
Prevalence	Institution Type (public/private)	0.51
	Program Type (CP/DPD)	0.06
	Percent Faculty RDNs	0.25[b]
	Class Size	0.45[b]
	Region (Northeast, South, Midwest, West)	0.33
	Degree Type (Undergraduate/Graduate/Both)	0.51
	Awareness	0.01*
Interest	Institution Type (public/private)	1.0
	Program Type (CP/DPD)	0.13
	Percent Faculty RDNs	0.52[a]
	Class Size	0.50[a]
	Region (Northeast, South, Midwest, West)	0.88
	Degree Type (Undergraduate/Graduate/Both)	1.0

*p-value considered significant. Significance was determined at $p < 0.05$.
[a] Mann-Whitney non-parametric t-test of sample means was used
[b] Kruskal-Wallis non-parametric one-way analysis test was used
All other p-values calculated using Fishers Exact test

Table 4. Summary of Responses Regarding the Prevalence of NDWN Approaches in the Curriculum

Survey Topic	
Present in the curriculum (Overall)	n=116
Yes	83 (71.6%)
No	29 (25%)
Unaware	4 (3.4%)
If YES - To what extent are NDWN approaches incorporated into your curriculum?*	n=81
A lecture – one class period only	43 (53.1%)
Chapter/Module	24 (29.6%)
Workshops or Case Studies	3 (3.7%)
A whole course is dedicated to this	1 (1.2%)
Other	10 (12.3%)
If NO - Is a NDWN approach something you are interested in including in the curriculum?**	n=23
Yes	17 (73.9%)
No	6 (26%)
If NO - Identify reasons why a NDWN approach has not been incorporated into the curriculum***	n=29
There is no room in curriculum	10 (34.5%)
No trained or knowledgeable faculty	10 (34.5%)
We like our current curriculum around weight management	5 (17.2%)
Do not think it is a priority	4 (13.8%)
* Only those who responded “yes” to NDWN approaches being present in in curriculum (n =83) answered this question, with 2 non-responders. **Only those who responded “no” to NDWN approaches being present in in curriculum (n =29) answered this question, with 6 non-responders ***Only those who responded “no” to NDWN approaches being present in curriculum (n =29) answered this question	

CHAPTER IV

EPILOGUE

I am very thankful for my experience as a graduate student in the Department of Nutrition at UNCG. At UNCG I was able to gain a wide range of experiences in and out of the classroom through research, teaching assistantship, interactions with the professors and the classes offered. The research I have presented here is part of my research experience as a graduate research assistant under Dr. McGuirt's mentorship. In my first year at UNCG, I was able to start researching with Dr. McGuirt and learn about his research, this grew into becoming his graduate assistant for the summer and my second year of graduate school. I was fortunate enough to have an advisor who allowed me to pursue research that was a little different than what he does. While I was helping with his research in nutrition environments, I started my own research evaluating curriculum of US dietetic programs. I came into this program with my Registered Dietitian Nutritionist credential already and planned on pursuing a clinical dietitian job following graduating with my masters. In my internships, I had learned of this non-diet weight-neutral approach and quickly figured out I wanted this to be my philosophy going forward in my career. I was excited to see that I could use this interest to create a research project evaluating if dietetic programs in the US were teaching this paradigm.

Through this project, I learned a lot about myself. First, I learned that my biggest weakness is the statistical analysis part of the research. I struggled with knowing what

tests to run and how to get the correct results. I combated this by reaching out to a friend of mine who knows a ton about stats. She helped to talk me through and guided me through many of the tests and how I should be going about my analyses. Another thing I learned about myself was that I can accomplish whatever I put my mind into. I was given the opportunity to write a thesis a year into my Master's program. This meant that if I still wanted to graduate in 2019, I would have a year to do my thesis. I was nervous about accomplishing it and whether or not I could do it. Looking back, I am glad I chose to move forward with it and push myself to get it all accomplished. I am really looking forward to seeing what my research can spark in the future.

Through the process, not only did I learn things about myself, but I enjoyed learning more about research. I was able to plan, implement and conduct this project on my own which gave me insight into what researchers go through in order to advance the knowledge base for all of us in nutrition. I enjoyed brainstorming the project and creating goals for myself, creating the survey to reflect what I was trying to research, and creating my manuscript that will someday be published. I especially enjoyed researching such a timely topic, while it had its challenges because it is a new topic, it is fulfilling to be able to contribute knowledge to this new topic that is currently being looked at in many organizations.

Lastly, if I would do anything differently on this project it would be to conduct qualitative interviews from some of the program directors. The qualitative interviews would have given me a fuller understanding of the presence or non-presence of NDWN curriculum. I would also have been able to ask further questions than what was on the

survey and could have expanded the results that we collected to reflect a fuller understanding and could possibly been able to offer up more ideas of how NDWN curriculum could be implemented in more institutions.

I am thankful for the opportunity to work with Dr. McGuirt and to be able to research a topic that is important to me and to the philosophy I want to practice in my future career. Through this research, I was able to better understand the researching process including developing, successfully conducting and writing up the research. These will be valuable skills to carry through my career and will help me to better understand the research that I come across in my future.

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APPENDIX A

SURVEY

Confidential

Nutrition Curriculum Components

How many faculty members are within the Nutrition Department at your university/college (part-time and full-time)? _____

What best describes your institution?
- ◯ Private
- ◯ Public

How many of your faculty are Registered Dietitian Nutritionists? _____

How many of your faculty is non-white (including Hispanic or Latino)? _____

What percent of your students are non-white (including Hispanic or Latino)? _____

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
BMI is a good determinant of health status	◯	◯	◯	◯	◯
Weight-bias (bias is attitudes or stereotypes that affect an individual's understanding, actions, and decisions) among healthcare workers is an important topic within the field of dietetics	◯	◯	◯	◯	◯
Race-bias (bias is attitudes or stereotypes that affect an individual's understanding, actions, and decisions) among healthcare workers is an important topic within the field of dietetics	◯	◯	◯	◯	◯

Have you heard of non-diet, weight neutral (not focusing on weight or reaching a certain weight) approaches to weight management, such as Health at Every Size?
- ◯ Yes
- ◯ No

Where have you heard of these approaches? Mark all that apply.
- ☐ Textbook
- ☐ Journal Articles
- ☐ Professional Organization (ex: The Academy)
- ☐ Conference or Presentations
- ☐ News
- ☐ Book (personal reading)

Are non-diet, weight neutral weight management approaches taught in your curriculum?
- ◯ Yes
- ◯ No
- ◯ I am not aware

To what extent are weight neutral approaches incorporated into your curriculum?
- ◯ A lecture - one class period only
- ◯ Chapter/Module
- ◯ A whole course is dedicated to this
- ◯ Workshops or Case Studies
- ◯ Other

Is a weight neutral approach something you're interested in including in the curriculum?

- ◯ Yes
- ◯ No

Identify the reasons why a weight neutral approach has not been incorporated into the curriculum? Mark all that apply.

- ☐ There is no room in curriculum
- ☐ No trained or knowledgable faculty
- ☐ Do not think it is a priority
- ☐ We like our current curriculum around weight management

Would you like to provide more information as to why a weight neutral approach is not in your curriculum?

_____

Is race-bias taught in your curriculum? (we are interested in whether you teach it as a topic, NOT whether you perceive that you inadvertently promote it.)

- ◯ Yes
- ◯ No
- ◯ I am not aware

To what extent is the topic of race-bias incorporated into your curriculum?

- ◯ A lecture - one class period only
- ◯ Chapter/Module
- ◯ A whole course is dedicated to this
- ◯ Workshops or Case Studies
- ◯ Other

Are you willing to be contacted in the future regarding these topics?

- ☐ Yes - Race-bias
- ☐ Yes - Weight neutral approaches
- ☐ Yes - Both
- ☐ No